

Zahradnik; a very interesting paper by Prof. Carl Pelz, on the construction of radii of curvature of conic sections, all considered as mere corollaries of one theorem of Steiner; and several papers, by Dr. Franz Studnicka, concerning the theory of determinants and polynomials; and by Prof. J. Solin, on graphical integration; Prof. A. Safarik contributes a paper giving the results of his observations on the Transit of Mercury on May 6, 1878. After having compared the photographs of the sun during the years 1875 to 1878, with observations on storms at Greenwich, Prague, and Vienna, Prof. Zenger arrived, as is known, at the conclusion that the 12·6 days' periodicity of "storms" on the surface of the sun had the effect of producing the same periodicity in the appearance of tornadoes in the West Indian and of typhoons in the Indo-Chinese Seas. Now, he discusses the storms noticed at Windsor (Australia) during the years 1863-75, and discovers in their appearance the same periodicity; the average deviations from it for the 29 duodecades of each year, being mostly but fractions of one day. But it must be observed that, for calculating the average error of these deviations, Prof. Zenger not only does not make use of the methods of least squares, but takes into account the *signs*, positive or negative, of the deviations, which method considerably diminishes the errors. Discussing Quetelet's tables of falls of meteorites, he arrives at the conclusion that these last also show the same periodicity. An elaborate paper, by Prof. Augustin, gives the results of thirty-eight year's observations of temperature at Prag, the averages being: winter, $-0^{\circ}56$ Cels.; spring, $8^{\circ}77$; summer, $19^{\circ}01$; autumn, $9^{\circ}60$; year, $9^{\circ}18$.

Several communications are devoted to mineralogy, and we notice among them the papers of Prof. Krejci on the crystallisation of quartz, and on the homoecorphism of Sphalerite, Wurtzite, and Greenokit; on transformation-symbols, by Dr. N. Daubrawa; and on minerals from the Kuchelbad diabase, by MM. Preis and Urba. The papers on palæontology, geology, zoology, and botany, mostly deal with the fauna and flora, fossil or existing, of Bohemia itself. Dr. Ant. Fric gives a list of all fossil animals found in the coal and limestone of the Permian formation in Bohemia; whilst only two species were known from this formation in 1868. M. Fric's list includes no less than 87 species, mostly labyrinthodonts and fishes. Dr. O. Novak publishes his researches on hypostoms of trilobites; and Dr. O. Freismantel contributes three papers: on Nöggerathias of the Bohemian coal-fields; notices on the *Nöggerathia*, Stbg., *Nöggerathiopsis*, Fstm., and *Rhiptozanistes*, Schmalh., and the description of a new Calamaria, *Discinites bohemicus*. M. K. Taranek gives a description of Diatomaceæ from Bohemian marshes; Dr. J. Schöbl publishes the results of his researches on the reproduction of Isopod crustaceans; and Dr. Ullik, the results of several analyses of Bohemian waters. In the Ethnographical Department we notice a paper by Dr. Jirecek, on Walachians and Mauro-Walachians, according to documents found at Ragusa.

The next volume of the *Sitzungsberichte*, for the year 1880, is as rich as the preceding one. Dr. F. Studnicka continues his researches on the theory of determinants, and describes a new property of them, already observed by M. Catalan; and M. F. Mertens gives a new geometrical application of the rule of multiplication of determinants. Dr. A. Seydler studies the movement of a point on given curves and superficies. In the domain of physics we notice but one paper, by Dr. K. Domalip, on the alternating discharges of electricity in rarefied space, in which paper the author deals especially with luminous back-currents. The researches of Prof. W. Zenger on the 12·6 days' periodicity, are continued in this volume. He remarks that this period is equal to one-half of the duration of each rotation of the sun, and tries to prove that the earthquakes in Southern Italy, from 1349 to 1873, as given by Prof. Suess, also fell on such days as closely coincide with the 12·6 days' period. He discovers the influence of the same periodicity in the dates of the passage of comets, from A.D. 371 to 1864, through their perihelium, as well as in the dates of meteoric showers. In further papers he tries to establish that the same periodicity might be discovered as to the maxima and minima of atmospheric pressure, of temperature, &c., and of magnetic disturbances. Finally, he shows that the sidereal durations of the revolutions of all planets are but multiples of the half rotation of the sun, and he finds that the same number appears also in the lengths of the months of the moon and of the satellites of Jupiter, Saturn, and Uranus. He concludes that "the cause of the movements in our solar system must be sought for in the

rotation of the sun," and that all phenomena of gravitation, magnetism, and electricity are but modifications of the same cause which occasions the rotation of the sun. Dr. F. Augustin contributes a paper on the climate of Prag, being a *résumé* of the meteorological observations made since 1840, and another paper on the influence of clouds on the diurnal march of temperature at Prag. Among geological papers we notice: the communication by Dr. Fric on the discovery of fossil remains of a bird, *Cratornis Hlavaci*, in the chalk of Bohemia ("Ierschichten"); the description of a new Tertiary Batrachian, *Palæobatrachus bohemicus* (H. v. Meyer), from the brown coal at Böhmisch-Kamnitz, very similar to the *Palæobatrachus Goldfussi*, but different from it in the structure of several parts of the skeleton. M. Carl Heilmantel contributes two papers on the fossil flora of the Hangend-ridge of the Kladno-Rakonitz coal-basin, characterised by the abundance of *Filices*, *Alethopteris Serlii*, and *Cyatheites arborescens*, being most common, and appearing in masses, whilst the *Sphenopteris* is scarcely represented, the *Neuropteris*, so characteristic of the lower deposits, completely disappears, and the *Lepidodendrons* become very rare. The group of *Leiodermaria* becomes, on the contrary, most usual, and acquires a new representative in the Permian *Sigillaria denudata*, Göpp., whilst Conifers become more numerous. The flora acquires thus a decidedly Permian character. Mr. J. Woldrich contributes a paper on the diluvial fauna at Sudslavic, close by Vimperk; it bears a decidedly northern character, as it contained remains of *Myodes torquatus*, *Nyctea nivea*, *Leucocyon lagopus*, *Fatorius Erminea*, *Lepus variabilis*, *Arvicola nivalis*, *A. gregalis*, *Lagopus alpinus*, &c. Prof. A. Belohoubek gives an interesting sketch of the influence of geological structure on the chemical composition of water in very many springs and wells from different geological formations: old gneisses, Huron, Silurian, Carboniferous, Permian, Chalk, Tertiary, and Diluvium in Bohemia. The best water, as far as can be concluded from M. Belohoubek's researches, which he considers himself as only preliminary—is given by the Gneiss, Permian, and partly also by the Chalk; the worst, by the Carboniferous and Silurian. Dr. Vějdovsky gives a list of Rhizopods inhabiting the wells at Prag, several species of *Amœba*, *Centropyxix*, *Euglypha*, *Trinema*, &c., being characteristic for special wells. M. Taranek gives a description of Diatomaceæ at Warnsdorf. Prof. J. Dedecek gives a sketch of Bohemian Polytrichaceæ, and deals in another paper with the distribution of Hepatic mosses in Bohemia.

In the *Annual Reports* we notice, besides the public lectures read at the annual meetings, a most useful, complete bibliographical indexes of works and papers published by different members of the Society since the beginning of their scientific careers.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—From the annual report on the local lectures in populous centres, we learn that 12 out of 23 courses of lectures in the Michaelmas Term of 1881, and 10 out of 20 courses in the Lent term of 1882, were on scientific subjects, and were delivered to audiences amounting in all to 1042 persons in the former term and 645 in the latter. This refers only to the work exclusively conducted from Cambridge, without including the courses of lectures in London and in the counties of Durham and Northumberland, which are also largely under the influence of the Cambridge system.

University College, Nottingham, has applied to be affiliated to Cambridge.

A further report of no progress has been made by the Sedgwick Museum Syndicate. It is estimated that 14,716*l.* is the present value of the investments and balances of the Memorial Fund. All that can be said as to the prospects of building is that further acquisitions of sites near the new museums make satisfactory proposals more possible. Prof. Hughes has addressed a letter to the Vice-Chancellor showing that a considerable proportion of the funds for building the present Woodwardian Museum and Library was sought and given expressly for a geological museum, so that the University may fairly be expected to find 15,000*l.* as the value of the present museum if it takes possession of it for the use of the Library.

The first part of the Natural Sciences Tripos has placed 24 men in the first class, 20 in the second, and 10 in the third, while

7 receive an ordinary degree, and 5 are excused the general examination. Six lady students are formally classed, the three in the first class being Girton students. Thus we have the unprecedented total of 72 names in one tripos list in natural science at Cambridge. Of those in the first class, Trinity and Christ's Colleges furnish 6 each, St. John's 5, Caius and King's 2 each, and Emmanuel and Clare and the non-collegiate students one each.

UNIVERSITY COLLEGE, LONDON.—Mr. L. F. Vernon-Harcourt, M.Inst.C.E., has been appointed Professor of Civil Engineering and Surveying. Mr. Kennedy retains the Professorship of Engineering and Mechanical Technology.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 5.—On the relations between galvanic polarisation and the surface-tension of mercury, by A. Koenig.—On the work of external forces furnished in a closed circuit, by R. Colley.—On galvanic polarisation, and on the Smee element, by W. Hallock.—Theory of circulatory and elliptically-polarising media, by E. Ketteler.—On the change of the colour-tone of spectral colours and pigments with decreasing intensity of light, by E. Albert.—On the influence of deformation on electric conductivity, by A. Witkowski.—Researches on the height of the atmosphere and the constitution of gaseous heavenly bodies, by A. Ritter.

Journal de Physique, May.—Electro-chemical figuration of equipotential lines on any portions of a plane, by A. Guébbard.—Note on the tangent-compass, by M. Mascart.—Variation of the coefficient of viscosity with the velocity, by B. Elie.—Apparatus for showing and measuring in projection, and simultaneously, the plane of polarisation of the analyser and of the crystalline plate, by L. Laurent.—Register of the duration of rain, by M. Schmeltz.

Bulletin de l'Académie des Sciences de St. Pétersbourg (vol. xxviii. fasc. 1).—Analysis of samples of water from lakes and sources in Tibet, by Dr. C. Schmidt.—Measurements of crystals of Datolith, Amphibol, and Vanguelinit, by B. Koksharov.—On the necessary degree of sensibility of magnetic variation instruments, by H. Wild.—Galvanic phenomena in the cerebro-spinal axis of the frog, by J. Setschenow.—Remarks on the Amphiphærids, by Dr. A. Strauch.—New researches on the hypothesis of a resisting medium, by O. Backlund.—Effects of the tension on the electrical resistance of copper-wires, by O. Chwolson.

WE notice in the last number of the "Journal of the Russian Chemical Society" (vol. xiv. fasc. 4), an interesting paper by M. Radoulowitch, on the formation of peroxide of hydrogen during the oxidation of the terpenes, in which he tries to establish, contrary to the opinions of MM. Berthelot and Papasogli, that the oxidation processes manifested by the turpentine oil are not due to the presence of oxygenated compounds of nitrogen, but to the presence of peroxide of hydrogen. In the same number of the "Journal" Prof. Menshutkin gives a summary of his extensive work on the formation of ethers. M. Schwedoff contributes a paper in which he refutes the opinions as to the tails of comets being the result of the repulsive force of the sun on the matter of the comets, and especially the conclusions arrived at by Prof. Bredikhin on the subject; and M. Jouk publishes numerical results as to the temperatures of boiling of methyl alcohol and amylene.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, June 8.—S. Roberts, F.R.S., president, in the chair.—Messrs. J. W. Berry, A. R. Forsyth, and J. Wood were elected Members, and Mr. R. A. Roberts was admitted into the Society.—The following communications were made:—On the extension of certain theories relating to plane cubics to curves of any deficiency, A. Buchheim [the object of the paper was the extension, by the use of Abelian functions, of certain theories which, in the case of plane cubics, are immediate consequences of the representation of the co-ordinates of a point of the curve as elliptic functions of a parameter. The theories considered were: (1) the theory of Steiner's polygons, and (2) Prof. Sylvester's theory of derived points (cf. Clifford's "Classification of Loci")].—On the differentiation with respect

to the modulus of the amplitude of elliptic functions, Rev. M. M. U. Wilkinson.—Two notes: (1) a definite integral; (2) equation of the director circle of a conic, Prof. Wolstenholme [(2) got, in the case of oblique cartesian co-ordinates, in the form $\frac{d^2u^2}{dx^2} + \frac{d^2u^2}{dy^2} = 2 \frac{d^2u^2}{du dy} \cos \omega$].—Theory of orthoptic loci, Rev. Dr. Taylor [the orthoptic locus of any curve is the locus of intersection of tangents at right angles].

Linnean Society, June 1.—Frank Crisp, LL.B., treasurer, in the chair.—Mr. H. C. Burdett was elected a Fellow of the Society.—Mr. H. N. Ridley drew attention to an *Equisetum maximum* from Swanage, having a spike of fructification surmounted by a branch-bearing portion, and remarkable on account of the transition of the sporophores along with the brown acuminate leaves.—The Rev. G. Henslow exhibited malformed specimens of wallflower, of rhododendron, and of the Garden Ranunculus.—Mr. Marshall Ward read a paper on his researches on the life history of *Hemileia vastatrix*, the fungus of the coffee-leaf disease. The phenomena attendant thereon shows great analogy to those of the Uredine fungi. The spores, under favourable conditions, viz., moisture, a due supply of oxygen, and a temperature of 75° F., usually germinate in from twelve to twenty-four hours.—Complete infection or establishment of the mycelium in the intercellular passages of the leaf occurs about the third day after the formation of the germinal tubes. The so-called yellow spot or ordinary outward visible appearance of the disease manifests itself about the fourteenth or fifteenth day, but may be delayed; its development and course being dependent on secondary causes, such as atmospheric conditions, monsoons, age of the coffee-leaf, &c. By watching the progress of the spots it has been ascertained that the spores therefrom may be continuously produced for from seven to eleven weeks or even more. Some 150,000 spores have been estimated as present in one yellow cluster spot, and as 127 disease spots have been counted in one pair of leaves, the quantity of spores thus regularly produced must be enormous. According to the amount of diseased spots, the sooner the leaf falls; and though young leaves arise, the fruit-bearing qualities of the plant necessarily are seriously interfered with. The various sorts of coffee plant are all liable to infection; the only possible remedy is the difficult one of destruction of the spores, and these are supposed originally to have been introduced from the native jungle, and rapidly spread under the favourable conditions of artificial cultivation.—Dr. Hoggan read a paper on some cutaneous nerve-terminations in mammals. He related observations on the habits of the mole (*Talpa*), with reference to its nasal organ, as a special sense of touch, and of the tail as a tactile organ. The so-called "Organ of Eimer" in the mole's nose, its fibres and cells, are similar in character to the ordinary sub-epidermic nerve-cells and their intrapidermic fibrillar prolongations. There is a probability that the inner circle of fibrils possesses the power of touch, and that the centre ones and those of the outer circle provide the sense of temperature, pain, and other sympathetic functions. The Paccinian bodies at the root of the organ probably register pressure.—Mr. C. B. Clarke read a paper on two Himalayan ferns erroneously described in the ferns of British India.—A communication was made on the Ascidiæ collected in the cruise of the yacht *Glimpe* in 1881, by Mr. H. C. Sorby and Prof. W. A. Herdman. Twelve species were noted, one *Molgula capiformis*, from near Poole, being new.—Mr. P. H. Carpenter followed by descriptions of new or little-known Comatulæ, being material derived from the *Challenger* expedition and Hamburg Museum. The author institutes the new genus *Eudocrinus* for Semper's *Ophiocrinus*.—Two other papers read were:—Notes on recent additions to the New Zealand flora, by Mr. Thos. Kirk, and descriptions of four new species of *Donax*, by Mr. Sylvanus Hanley.

Physical Society, June 10.—Prof. Clifton, pre ident, in the chair.—New member, Major-General Martin, R.E.—Mr. W. F. Stanley read a paper on sonorous vibrations, especially those of the tuning-fork. The larger and more visible movements of a sounding-body do not appear to be best fitted to propagate musical-sounds as was shown by placing disks on the prongs of a powerful fork, which, when vibrating, could then only be heard a short distance, whereas, by its smaller longitudinal motions, when placed on its resonator, it produced a penetrating sound. The vibration down the stem of the fork was shown not to depend upon a vibrating ventroid, as suggested by Chladni, for a fork cut in the end of a solid steel bar communicated sonorous vibrations equally well to the resonator. To set a fork in vibration it was necessary to